Cainhoy Plantation PRMP Outline - Prepared for Interagency Meeting

1. Mitigation Options and Evaluation Process

The Mitigation Rule (33 C.F.R. part 332) established a hierarchy of mitigation approaches that should be evaluated for determination of the level of appropriate compensatory mitigation for a proposed project. The hierarchy states:

i. Mitigation Banks in the watershed serving the project area
ii. In-Lieu fees program
iii. Develop a Permittee Responsible Mitigation Plan

The project is located within in the Cooper River Basin, Hydrologic Unit Code 03050201 between the Cooper and Wando Rivers. There are no in-lieu fee programs in the watershed, so this option was immediately eliminated from consideration. Pigeon Pond and Congaree Carton are the only two mitigation banks in this watershed. The Project is located in the secondary service area for Pigeon Pond and the primary service area for Congaree Carton. An additional proposed bank, Swamp Thing, is pending - the bank has not been approved and no credits have been released.

In September, 2017, Pigeon Pond had approximately 400 freshwater credits available with no additional credits available for release (K. Hance, Newkirk Environmental, personal communication, September 13, 2017), and Congaree Carton Mitigation Bank had 116 freshwater mitigation credits available with potentially 280 to 290 additional credits available for release by the end of 2017 (A. Wood, The Earthworks Group, personal communication, September 14, 2017). The estimate of credits needed for the proposed freshwater wetland impacts is approximately 2,400 credits. Therefore, there are an insufficient number of credits available in the watershed to mitigate for the proposed wetland impacts associated with the Project.

2. Site selection for Mitigation Project

Stakeholder outreach and property searches were conducted to identify potential mitigation opportunities and priorities in the same HUC (03050201) as the Project. Several meetings were conducted with representatives from permitting agencies to obtain input. In addition, stakeholders in the local conservation community were contacted to obtain conservation priority input, including Lowcounty Land Trust (LLT), South Carolina Coastal Conservation League (SCCCL), the Francis Marion National Forest (FMNF), Lord Berkeley Land Trust (LBLT), The Nature Conservancy (TNC), the US Fish and Wildlife Service (USFWS), the South Carolina Department of Natural Resources (SCDNR) and the Former Board Chairman of the South Carolina Conservation Bank. Protecting a portion of the Property came to the forefront of the PRM options partly due to:

1) The size and high ecological value of the habitat proposed for mitigation on the Property.
2) Adjacency to the FMNF, including critical habitat designated for the frosted flatwoods salamander (*Ambystoma cingulatum*). Wetlands in this area have been evaluated and raked as highly suitable for frosted flatwoods salamander re-introduction.
3) Additionally the PRM site provides a buffer between the proposed Project and the FMNF so as not to limit the FMNF from using prescribed fire to manage forest communities.

4) The importance of the aquatic resources being proposed for protection on the Property that are at risk for development.
5) Is in the same HUC as the area of propose impacts.
6) Provides for on-site and in kind mitigation.
7) Provides excellent habitat for a large range of federally threatened and endangered species as well as habitat for at risk and candidate species. This proposed PRMP offers the opportunity to preserve, buffer, enhance and restore a great diversity of wetland and upland habitats.
8) Currently provides habitat for a pair of bald eagles, gopher frog, and Pondberry.

TNC was asked to conduct an evaluation of significant conservation values on the Property. This information, as well as information obtained from several onsite meetings with various stakeholders and regulatory biologists, created the framework and outline for the proposed PRM area discussed below.

The proposed PRM area on the Property is located in an area between the Cooper and Wando River and lies on a physiographic feature known as the Cainhoy Scarp. It is immediately adjacent, and will be connected to, the nationally recognized FMNF, which provides one of the largest expanses of longleaf pine forest in the world. More specifically, the FMNF is known to provide habitat for a host of protected species, such as the red-cockaded woodpecker (*Picoides borealis*) and the flatwoods salamander. Supporters of this PRMP recognize the importance to maintain this connection to the FMNF, as the FMNF is identified as a Significant Geographic Area for the maintenance and reestablishment of longleaf pine, and plays a crucial part in the recovery of the protected species that inhabit longleaf pine ecosystems. Using a portion of the Property as a PRM site will continue to protect and enhance aquatic resources, improve habitat protection and connectivity, and provide appropriate public access, thereby yielding great public benefits.

The proposed mitigation area will encompass approximately 4,500-acres of which an estimated one-half of the mitigation site provides for a large diversity of wetland types. Wetlands in the proposed PRM area demonstrate a diversity of habitat types with a high ecological value and include at a minimum, bottomland hardwood forests, brackish marshes, depression wetlands, freshwater marshes, intertidal mud/sand flats, pine savannahs, pond cypress ponds, salt marshes, tidally influenced impoundments with associated upland areas including xeric mixed pine woodlands, mature longleaf pine stands, loblolly pine stands, maritime forests, mesic mixed hardwood forests and, planted longleaf pine stands. The wetlands proposed for impact are of the same type and condition as those being protected. In many cases, the wetlands being proposed for protection are in better condition than those proposed for impact. The similar resource condition adheres to the Rule that the mitigation resource type as the same as the impact sites.

When addressing the Rule statement that compensatory mitigation provided by an approved mitigation bank or in-lieu fee program is presumed to be environmentally preferable to PRM because it usually involves larger more ecologically valuable aquatic resources, the proposed PRM site is approximately 4,500-acres with a large diversity of ecologically valuable aquatic resources. The two mitigation banks in the watershed, Pigeon Pond and Congaree Carton, have a total combined acreage of 1,863-acres. When compared to the combined acreages of all the mitigation banks in the Cooper River Basin, both existing banks and pending banks, their combined acreage is 3,794.3-acres (per RIBITS review). The PRM site exceeds the combined acreages of all the banks by approximately 700-acres.

The Guidelines for Preparing a Compensatory Mitigation Plan Last Revised October 7, 2010 (Guidelines) were developed by USACE Charleston District to provide a framework to help permit applicants prepare a complete mitigation plan that complies with the Rule. The Guidelines were used to determine appropriate mitigation to offset the impacts associated with the proposed project. The applicant is proposing a PRM compensatory mitigation plan that adheres to the spirit and requirements of the Rule.

The proposed PRMP described herein is based upon the likelihood that the PRMP will be both successful and sustainable, that the PRMP involves large ecologically valuable aquatic resources, employs a rigorous scientific and technical analysis for success on many levels, and is strategically situated in an area/watershed experiencing tremendous development pressures.

3. Permittee Responsible Mitigation Plan – Point Hope Nature Sanctuary

The Point Hope Nature Sanctuary (PHNS) is approximately 497 acres in size and is located in the northern portion of the Property north of Clements Ferry Road, east of Jack Primus Road and west of Cainhoy Road, and owned by Seven Sticks, LLC and Tract 7, LLC. The attached map shows the PHNS in relation to the Property, the FMNF and other protected properties.

All 263 acres of wetlands, as well as 234 acres of adjacent upland buffer acreage, will be preserved as part of this Plan. Approximately 225 acres will receive enhancement from planting and other vegetative modifications. The upland acreage outside of the upland buffers will be preserved and managed to reestablish and/or maintain a longleaf pine ecosystem present. Prescribed fire will continue to be applied to this landscape, in perperuity.

PHNS is viewed as critically important to regional land efforts to protect important longleaf pine habitats adjacent to flatwoods salamander critical habitat, as well as protect water quality in the Cooper Watershed (HUC 03050201). It is strategically located to connect wetlands that connect the Cooper River, as well as provide widespread landscape scale protection that is essential to preserve large-scale functioning ecosystems, improving water quality for the Cooper River Watershed. PHNS also adds critical buffers to the FMNF, increasing the protection of the FMNF to impacts from development.

This PRM provides compensatory mitigation for the impacts to wetlands associated with the Project. The goal of this PRM is to replace the loss of aquatic functions and values at the impact sites through activities at the Property by enhancing wetlands to create a diversity of high quality wetland types for the potential re-introduction of the frosted flatwoods salamander, as well as other protected species, and the preservation of other aquatic resources of the existing wetlands that drain into Flagg Creek and other tributaries of the Cooper River within the project area as well as the overall ecosystem. Enhancement of degraded wetlands encroached upon by loblolly pine and other undesirable hardwoods will also take place.

The objectives are as follows:

- Enhance, buffer and preserve 80 acres of former longleaf pine savannah impacted by wildfire/beetle infestation and other forestry activities,
- Enhance, buffer and preserve 21 acres of cypress/tupelo wetlands,
- Enhance, buffer and preserve 124 acres of evergreen bay forested wetland,

- Preserve 50 acres of longleaf pine upland buffers
- Preserve and buffer 42 acres of hardwood forested wetlands,
- Maintain approximately 6 miles) of firebreaks to continue prescribed fire activities within the PHNS
- Preserve and Maintain 230 acres of upland longleaf pine ecosystem

The Plan includes the restoration, preservation and maintenance of fully functional longleaf pine ecosystem, the enhancement of cypress/tupelo wetlands, and the reversion of clearcut pine forest to a cypress/pine savannah. These activities will provide extensive ecological benefits to the Cooper River Watershed by enhancing and preserving large tracts of high quality habitat adjacent to the FMNF, while protecting and enhancing wetland habitats that will protect against the degradation of water quality of the Cooper River Basin.

The goal of the mitigation project is to enhance and restore forested and non-forested uplands and wetlands to an ecologically functional and biologically diverse longleaf pine (*Pinus palustris*) flatwoods ecosystem. An approximately 80 acre portion of the proposed Point Hope Nature Sanctuary was previously clearcut as a result of a wildfire/bug infestation, and remains void of an overstory and midstory. The ecosystem, including both wetland and uplands, will be restored to conditions optimal and desirable for many federally threatened and/or endangered species. The Plan will include vegetative management via mulching, thinning and clearing, prescribed burning, hydrology restoration and vegetative enhancement via supplemental planting. The specific measures for each management area are discussed below.

i. Management Area 1: Natural Longleaf Upland

Current Condition: The Point Hope Nature Sanctuary contains approximately 230 acres of extant longleaf dominated pine woodlands at an ideal density (40-60ft ^{2}/acre basal area), with excellent natural regeneration (attached map). This upland area is associated with approximately 42 acres of wetlands that are considered fully functional and pristine, and will be preserved in their current state. Prescribed fire has been the main management tool for this area in the past, and will continue to be applied in the future to promote understory herbaceous diversity and longleaf regeneration, and prevent the development of a thick midstory dominated by of undesirable hardwood species.

Desired Condition: Maintain current state and promote dominance of native vegetation.

Enhancement Activity: Apply prescribed fire at 2-3 year intervals to maintain current state. Growing season fire (Mid-March or later) is preferred.

ii. Management Area 2: Preservation of Wetlands Associated with Natural Longleaf Uplands

Current Condition: Approximately 42 acres of fully functional ephemeral and small stream forested wetlands are found within the natural longleaf upland (Management Unit 1) (attached map).

Desired Condition: Preserve and maintain native wetland vegetation dominance.

Enhancement Activity: The wetlands will be preserved in the existing natural state, but will be exposed to prescribed fire mimicking natural fire regime conditions.

iii. Management Area 3: Clearcut Wetland Enhancement

Current Condition: A pine forest dominated by longleaf and loblolly pine was clearcut approximately three years ago due to mortality of overstory vegetation associated with a wildfire and subsequential bug infestation. This area is approximately 76 acres in size (attached map). The clearcut is currently void of an overstory and midstory, and is composed of various herbaceous grass species.

Desired Condition: Enhance vegetation community to a biologically diverse pine savannah, similar to areas found on the adjacent FMNF.

Enhancement Activity: The previously clearcut wetlands will be replanted with appropriate wetland vegetation. Hardwood seedlings will be planted in the dormant season. Seedlings will be planted at a rate of 250 stems per acre. The wetland trees will be native species appropriate for the desired ecosystem. Based on the existing plant community in the reference sites, the area should be planted in bald cypress (*Taxodium distichum*).

iv. Management Area 4: Pond Cypress/Tupelo Wetland Enhancement

Current Condition: The Point Hope Nature Sanctuary contains approximately 21 acres of pond cypress/tupelo (*Nyssa biflora*) wetlands (attached map). These areas are characterized by having an extremely high overstory density, as well as a thick midstory within and around the wetland ecotone. Prescribed fire has been historically applied to these areas in the past, but the presence of a thick midstory and ecotone suggest fire has not been effective. In addition, species not historically native to this habitat type, such as loblolly pine and sweet gum, occur in these areas. Thick overstory and midstory in these communities prevents an adequate understory stratum from forming, and inhibits diversity. A lack of herbaceous grass species can interfere with invertebrate production, which is a fundamental food base for longleaf pine ecosystem-associated protected wildlife species, such as the RCW and the flatwoods salamander, among many other more common species. In addition, midstory and overstory closure reduces sunlight penetration and increases leaf litter accumulation, factors that can reduce dissolved oxygen levels and increase biological oxygen demand. These factors can have detrimental negative effects on the ability of these wetlands to support sensitive amphibians – high quality suitable wetlands known to support flatwoods salamanders and other Ambystomatid salamanders are characterized as having high levels of DO, reduced accumulation of leaf litter, open canopy conditions and high herbaceous density and diversity.

Desired Condition: The desired condition is to enhance the vegetative density and composition of the pond cypress/tupelo wetlands by reducing the overstory and midstory densities. Increase cover of herbaceous and graminoid vegetation. Reduce, and eventually eliminate, the presence of undesirable species, such as loblolly pine and sweet gum. Improve ecotone quality by reducing density of midstory cover and pine and hardwood encroachment. Restore and maintain appropriate fire regime, allowing fire to burn through wetlands and reduce fuel levels within wetlands.

Enhancement Activity: Use mechanical means to control undesirable shrubs in wetlands. This also includes the selective removal of undesirable overstory trees (e.g. loblolly pine, sweet gum) and desirable

overstory vegetation in areas of extreme density (e.g. cypress). Burn wetlands and adjacent uplands to reduce shrub midstory and promote open environment in the ecotones and within the wetlands. Ideally, burning these areas after mechanical treatment will facilitate in the decomposition and removal of residual coarse woody debris. This will improve habitat quality for sensitive amphibians by reducing leaf litter and biological oxygen demand, increasing herbaceous and graminoid density and diversity, important habitat components for invertebrate survival and amphibian egg mass attachment.

v. Management Area 5: Scrub/Shrub Wetland Enhancement

Current Condition: The Point Hope Nature Sanctuary contains approximately 124 acres of scrub/shrub wetlands (attached map). This area is composed primarily of dense Ericaceous vegetation, such as fetterbush (*Lyonia lucida*), gallbarry (*Ilex glabra*) and blueberry (*Vaccinium* spp.), with scattered black gum (*Nyssa sylvatica*) and pond pine (*Pinus serotina*) throughout. The shrub cover is extremely dense (100% cover in places), and is approximately 6-15 feet high.

The vegetative composition described above is indicative of insufficient fire regime, primarily where prescribed fire is introduced in colder and wetter months, and not in the growing season. Along the south side of the management area, roads and fields have served as a boundary to prevent fire from having the time and momentum to build to more effectively control the vegetation.

Due to variations in fire regime, evergreen scrub/shrub wetlands (bays) can vary in vegetative composition and density, as well as in organic soil matter. More frequent, and higher intensity, fire regime will reduce shrub thickness and organic soil (peat) persistence, and create openings for small open water wetlands dominated by grasses, sedges and rushes. These areas can support a variety of sensitive plants and animal species, such as Boykin's lobelia, pitcher plant and pond spice.

Desired Condition: Modify vegetative composition and structure to reduce shrub persistence and create a mosaic of herbaceous and open water habitat, suitable for rare flora and fauna.

Enhancement Activity: When ground and site conditions are appropriate, mechanically treat wetlands areas to remove dense overstory patches of undesirable vegetation. This will also assist in removing shrubs. Post mechanical treatment, conduct growing season burns across wetlands on a 2-3 year rotation.

vi. Management Area 6: Upland Clearcut Area Conversion to Longleaf Pine Ecosystem

Current Condition: A predominantly pine forest was clearcut approximately three years ago due to the negative effects associated with a wildfire and subsequential bug infestation. This area is an approximately 4 acre upland surrounded by adjacent wetlands and longleaf pine uplands (attached map). The clearcut is void of an overstory and midstory, and is composed of various herbaceous grass species. Longleaf pine and loblolly pine are currently regenerating in some areas.

Desired Condition: Fire maintained longleaf pine forest.

Enhancement Activity: The establishment of longleaf pine will be promoted by the application of prescribed fire on a 2-3 year rotation. This will ensure that competition from loblolly pine and other undesirable hardwood species will be minimized or eliminated in these areas, and will promote grasses, necessary as a fuel component until longleaf can grow out of their grass stage.

Credit Calculation

The wetland enhancement activities described above for each management area total approximately 263 acres. In addition, approximately 42 acres of wetlands within the Point Hope Nature Sanctuary are being proposed for preservation. An additional 50 acre upland buffer is being proposed as well, although approximately 230 acres of uplands will be preserved in perpetuity. Below is a preliminary evaluation of the number wetland mitigation credits generated by the proposed work plan outlined above.

Management Area 2- Preserved Wetlands

33.6 wetland credits will be generated from the preservation of the 42 acres of mesic mixed hardwood forests. 96.6 credits will be generated from the establishment and enhancement of 50 acres worth of upland buffer around these wetlands. **130.2 Total Credits**

Management Area 3- Clearcut Wetland Enhancement

220.4 wetland credits will be generated from the proposed enhancement activities of approximately 76 acres of clearcut wetlands.

Management Area 4- Pond Cypress/Tupelo Wetland Enhancement

Enhancement activities described above will generate **44.1 wetland credits** over the 21 acre area.

Management Area 5- Scrub/Shrub Wetland Enhancement

The 124 acres within this management unit will generate **260.4 wetland credits** through the proposed activities described above.

In total, **655.1** credits will be generated through the proposed restoration, enhancement, and preservation activities.

4. Permittee Responsible Mitigation – On-site and In-kind

i. Preservation and buffer enhancement

The onsite wetland preservation and buffer enhancement areas outside of the PHNS total approximately 3,588 acres, and are located throughout the Property. The attached map shows the proposed onsite wetland preservation and buffer enhancement in relation to the proposed PHNS.

This PRM provides compensatory mitigation for the impacts to wetlands associated with the Project. The overall goals of the proposed wetland mitigation are to preserve and enhance aquatic function and overall ecological health of the wetlands that eventually drain into the Cooper and Wando Rivers by protecting water quality, reducing landscape fragmentation, and preserving connectivity to other protected lands and waterways.

The primary objectives are as follows:

- Preserve and buffer 2,991 acres of freshwater wetlands.
- Preserve 597 (25ft buffer) acres of upland buffers

Credit Calculation

Approximately 2,991 acres of wetlands, outside of the PHNS, have been delineated. Approximately half of these wetlands have been verified by the USACE – the verification process in still in progress. With the exception of the wetland areas proposed for impact, all wetlands will be preserved and enhanced by a 25 foot buffer. A preliminary evaluation has shown that the preservation of these wetlands will generate **1,879.2 credits** and the associated buffer enhancement will create **1,074.6 credits**. In total the preservation and enhancement of the wetlands will generate **2,953.8 wetland credits**.

5. Credit Calculation Summary

In summary, the total estimated credits generated by the proposed mitigation are:

- Restoration, enhancement and preservation activities proposed on the Point Hope Nature Sanctuary (497 acres) will generate **655.1 wetland credits.**
- Preservation of approximately 2,991 acres of wetlands will generate **1,879.2 wetland credits**
- Associated buffer enhancement (597 uplands) will generate **1,074.6 wetland credits**.
- **TOTAL = 3,608 wetland credits**
- Estimate of wetland credits needed = **2,400**